IN THE SPECIFICATION:

Paragraph beginning at line 5 of page 1 has been amended as follows:

High ~~high~~ densification and systemization of LSIs has become widespread because of the recent small scale/high performance of electronic devices such as personal computers and portable telephones. Line widths for drawing circuit patterns currently in operation having a few million elements crammed onto a semiconductor chip of only a few millimeters square have also progressed from the micron to the nano order. In ~~, and in~~ order to realize this, technological development in the field of lithography has been unfolding. Heretofore, ~~Up to now,~~ the mainstream of lithography has been optical lithography technology, but the wavelength of light used has also become extremely short as the patterns become even finer, and processing has also been carried out using short wavelength lasers. However, with this processing ~~also~~ there is also a problem with respect to the optical systems and resist, and fine patterning using light exposure has gradually reached its limit. Therefore technology for radiating electron beams and extremely short ultraviolet rays instead of light has extremely good future prospects.

Paragraph beginning at line 15 of page 5 has been amended as follows:

The object of the present invention is to provide a focused ion beam device capable of easily enabling accurate perpendicular processing of pattern surfaces obtained in all directions without any difficulty, when performing correction processing for pattern defects of a penetrating structure in an electron beam exposure mask, and to enable electron beam (EB) ~~EB~~ exposure on a mask.

Paragraph beginning at line 16 of page 6 has been amended as follows:

A focused charged particle beam device of the present invention may further comprise ~~comprising~~ means for data storage of a processing correction angle α for a charged particle beam used, and means for controlling setting of ~~the~~ a sample tilt angle to 90° + α based on data α, so that the device can easily carry out perpendicular processing of a slice in all directions for a pattern of a penetrating structure for an electron beam exposure mask.

Paragraph beginning at line 10 of page 7 has been amended as follows:

As described above, the present invention provides a focused ion beam device capable of accurate perpendicular

processing of pattern surfaces obtained in all directions without any difficulty, when performing correction processing for pattern defects of a penetrating structure in an electron beam exposure mask. Conventionally, it would be normal to carry out this type of fine correction processing using an FIB device, and since an ion beam has a normal power distribution, the process surface had a tapered shape. To solve this, it has been considered to carry out processing by tilting the sample, but it is difficult to handle a sample with processing surfaces in all directions using only a single axis tilt capability. By providing 5 axis capability, namely movement of the sample stage in three dimensions XYZ, rotation R and tilt C, in the related art FIB device, theoretically a desired tilt angle is achieved using the C mechanism, and if the R mechanism is used it is possible to perpendicularly process a slice in all directions for a pattern of a penetrating structure for an electron beam exposure mask. However, if this is practically implemented, processing locations that are not on the rotational axis suffer from positional deviation due to the rotational drive, <u>and</u> time and effort are wasted in operating a drive mechanism to correct this positional error. Taking into account the fact that in practical terms this is unrealistic the present invention has been conceived to arrange a two axis tilt (double tilt) mechanism at the lowest

position in a sample stage drive mechanism, and to have a mechanism capable of realizing tilt in all directions with respect to a lens optical axis in a state where it is difficult for positional error to arise.

Paragraph beginning at line 10 of page 8 has been amended as follows:

The basic structure of the present invention is shown in Fig. 1A and Fig. 1B. Fig. 1A is a plan view of a sample stage looking from a beam irradiation direction, and Fig. 1B is a cross sectional view of the sample stage 6 looking from the side direction. Orthogonal X and Y axes are shown in the plan view, but these axes are set so as to align with the sample surface, and the point at which they cross is set to align with the optical axis of a lens optical system. This is in order to ensure that there is no positional slip of the sample due <u>to</u> tilt operations about the axis. The present invention has this mechanism arranged at the lowest stage of a sample stage drive mechanism. In this way, it is made possible to tilt the sample surface in all directions around the lens optical system, and at the same time there is no deviation of the crossing point, being a central part ~~if~~ <u>of</u> the sample, from the beam irradiation position (on the axis of the lens optical system) even if the sample is tilted. The

processing position of the sample surface is not always the center of the sample, but by having the X, Y drive mechanism on the tilt mechanism, an X-Y sliding surface will be tilted at the same angle, and no matter where the processing location is, if that X, Y coordinate position is moved to it will be possible to hold the location at the same beam irradiation position.

Paragraph beginning at line 5 of page 9 has been amended as follows:

Fig. 2A and Fig. 2B show a comparison of processing results for perpendicular processing of a slice pattern for an electron beam exposure mask 1 having a penetrating structure with the related art device and with the device of the present invention. With the related art structure shown in Fig. 2A, if an FIB 5 is irradiated with the sample surface orthogonal to the optical axis of the lens optical system and correction processing is carried out by sputter etching of an opaque defect section shown by dots in the drawing, since the FIB 5 has a normal strength distribution, even though a beam that is subjected to the accumulative effects of a fringe section at an upstream side is perpendicular, as shown in Fig. 2A, there is a tapered remaining portion after sputter etching has been carried out. On the other hand, if the device of the present

invention is used, as shown in Fig. 2B, the process surface is tilted by an amount corresponding to a taper angle based on the sputtering characteristics of the FIB 5 used (here it is about 3°), and if the FIB 5 is then irradiated to carry out correction processing of the opaque defect section 7 shown by dots in the drawing by sputter etching, desired surface etching is realized. This is because although the FIB 5 performs sputtering to process the same tapered shape, the surface to be processed is itself not perpendicular, and is tilted by the taper angle. The object of processing in this case is an electron beam exposure mask having a penetrating structure. The double tilt mechanism of the present invention can handle tilt surface directions for all surfaces of through holes, which means that it is possible to carry out processing in a cross sectional shape that is the same from the surface side to the rear surface side of a mask.

Paragraph beginning at line 13 of page 10 has been amended as follows:

The main element of the present invention is the drive mechanism for the sample stage. This embodiment is shown in the following. An inclinable stage is adopted which is capable of handling at any angle through 360° ~~direction~~ with two orthogonal axes as a center, and a high precision

3-axis stage (XYZ) is mounted on the inclining stage. As shown in Fig. 1B, the double tilt mechanism adopted with this embodiment has a stage side hemispherical protuberance fitted into a hemispherical indentation formed in a fixed body section, to form a hemispherical slide mechanism 10, and also comprises a tilt drive mechanism for <u>tilting about</u> two orthogonal axes. A 3-axis X, Y, Z stage provided with a laser interferometer so as to be capable of high speed high precision operation is adopted. Also, respective processing correction angles α corresponding to types of FIB having different acceleration, beam current values, etc., are stored in advance in storage means of a computer <u>24</u> as data. <u>An X-direction actuator 26 and a Y-direction actuator 28</u> ~~Two actuators~~ are provided in the 2-axis tilt drive source, and a processing correction angle α corresponding to the type of FIB used is read out from the storage means, and the actuators are controlled so that an angle defined by a correction surface and an incident beam is always $90° + \alpha$.

Paragraph beginning at line 13 of page 11 has been amended as follows:

Since the focused charged particle beam device of the present invention has a mechanism capable of movement <u>along</u> ~~in~~ three <u>axes</u> ~~dimensions~~ X, Y and Z <u>and has</u> mounted

therebelow ~~below~~ a mechanism capable of tilting about ~~in~~ two of the three axes ~~axial directions,~~ X and Y, and has a mechanism capable of setting a sample surface in a tilt angle range from perpendicular to a few degrees with respect to the focused charged particle beam, it is possible to correct a ~~an~~ clear defect of an electron beam exposure mask, and to make a mask process surface perpendicular. In this way, faithful electron beam exposure is enabled on a mask.

Paragraph beginning at line 21 of page 11 has been amended as follows:

Because the focused charged particle beam device of the present invention comprises means for data storage of a processing correction angle α for a charged particle beam used, and means for controlling so as to set an angle defined by a mask correction surface and an incident beam to $90° + \alpha$ based on data α, it is possible to easily carry out perpendicular processing of a slice in all directions for ~~a~~ an electron beam exposure mask pattern having a penetrating structure.